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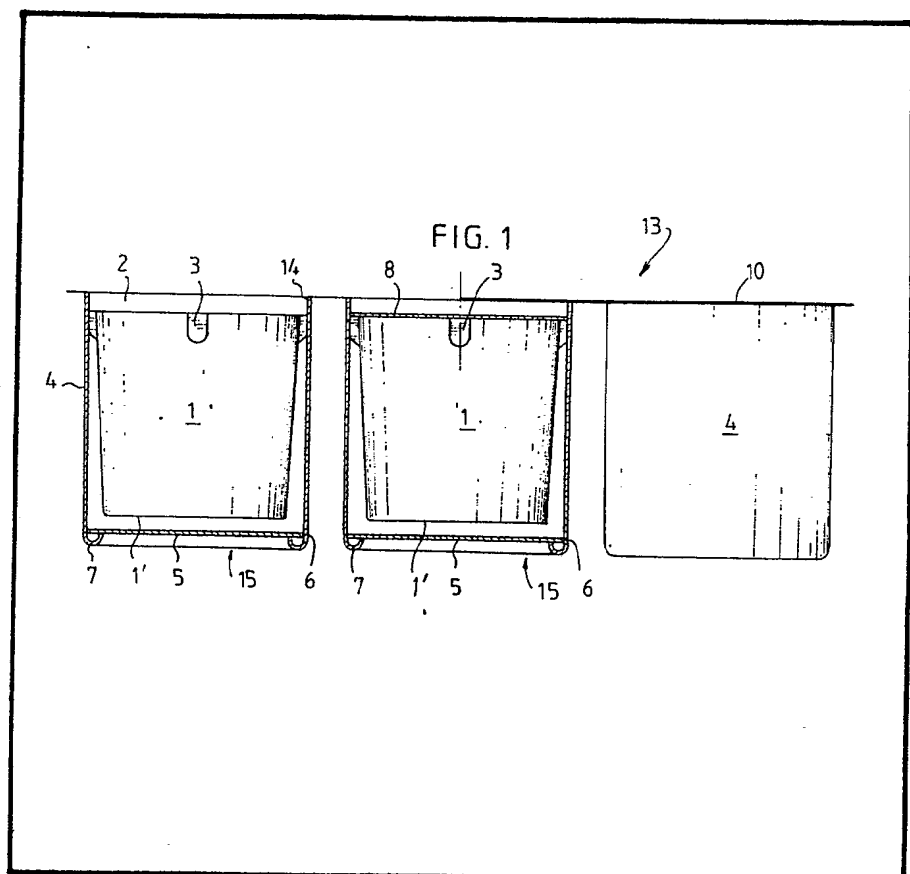
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(54) Heat-insulating receptacles

(57) A heat-insulating receptacle, particularly for food products, comprises an inner receptacle 1 of impervious material having a flange 2, an outer receptacle 4 fixed to the flange of the inner receptacle by adhesion or welding, an inner cover 8 which can be fitted after the inner receptacle has been filled, to the opening of the inner receptacle, a second cover 10 of impervious light and strong material attached to the upperside of the flange 2 by adhesive or welding.

A method of assembling the said isothermal receptacle and of packing products, particularly food products in such a receptacle utilising a high-speed automatic installation comprises assembling one or group of inner receptacles in the outer receptacles prior to or after filling and sealing the inner receptacles.

Applications for packing ice-cream and the like, cold drinks, milk products and, in general of all food products of which the texture, the state of the freshness are susceptible to deterioration during storage or transportation at ambient temperature.



GB 2 130 168 A

FIG. 1

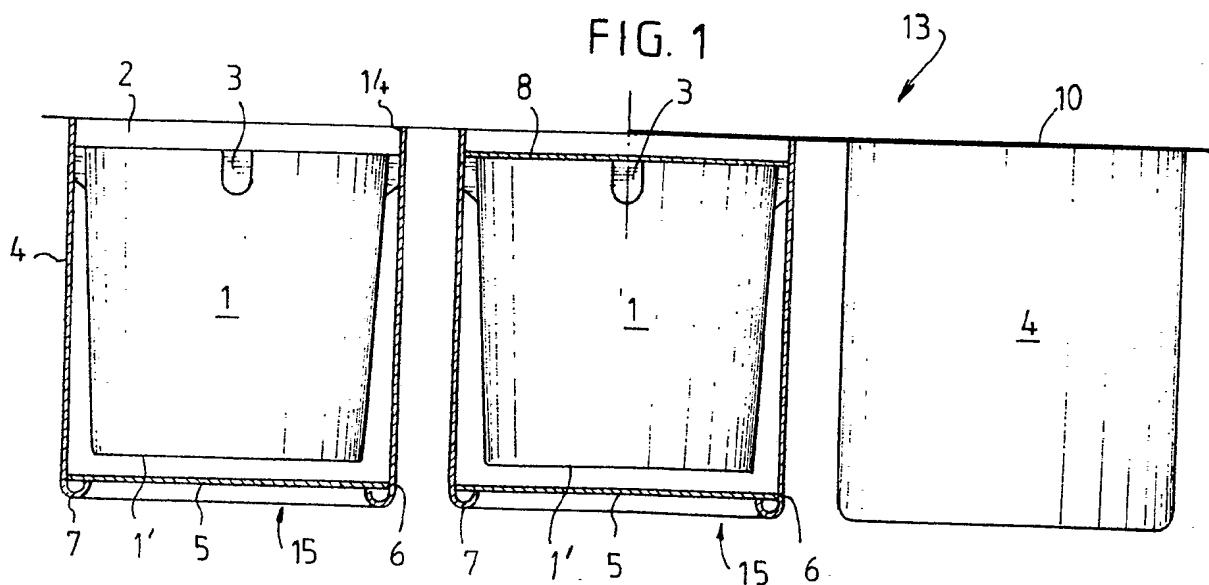


FIG. 2

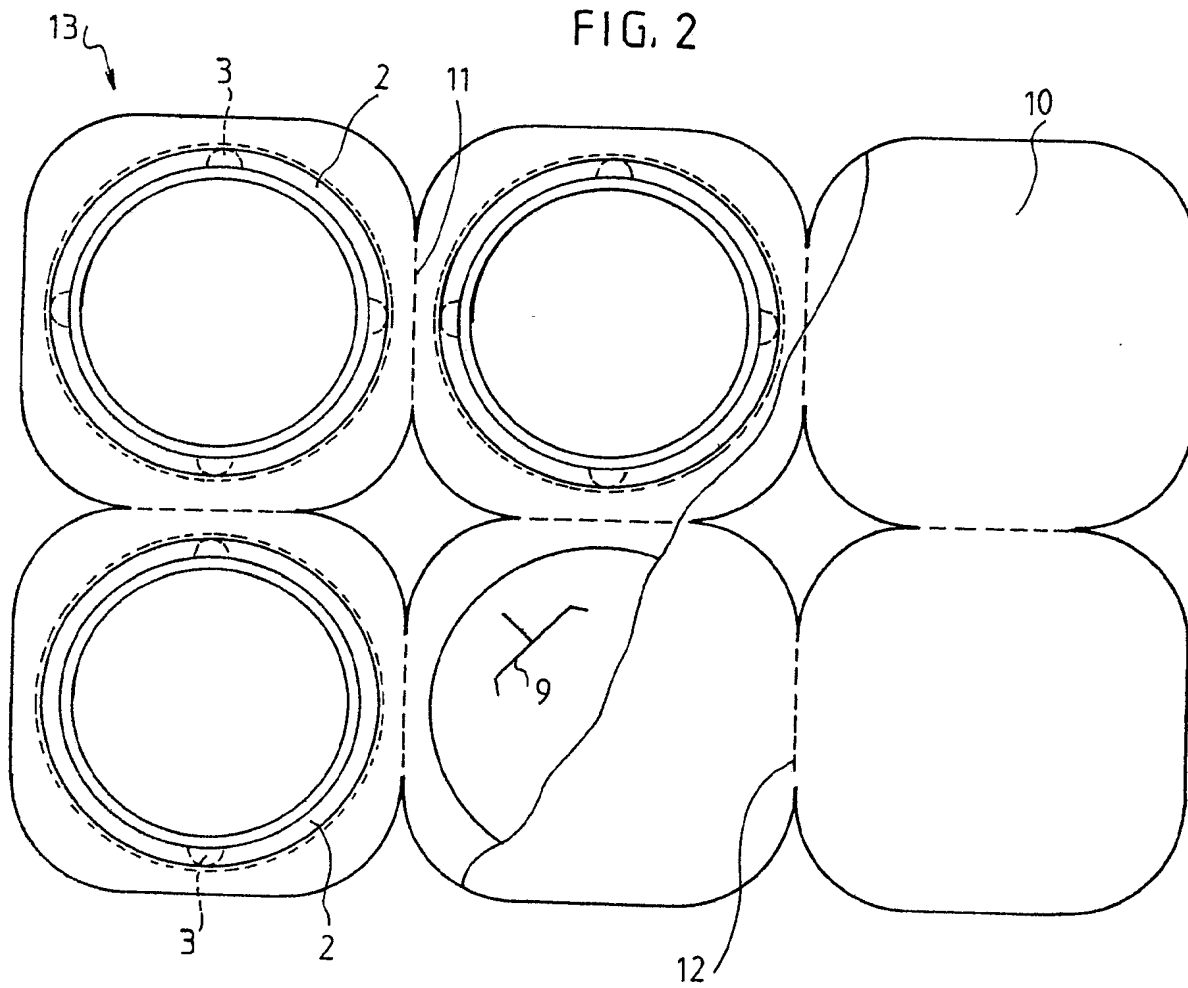
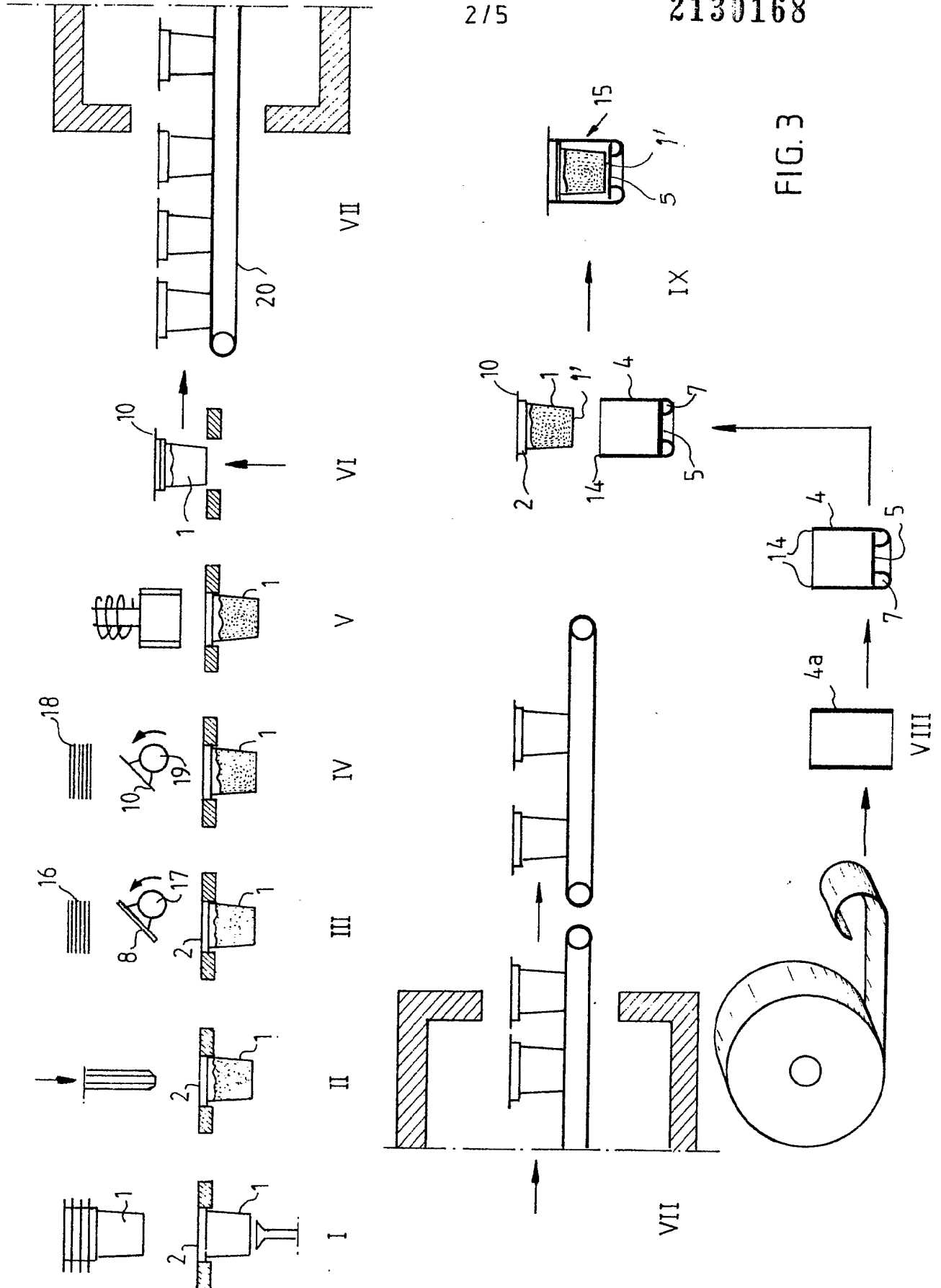


FIG. 3



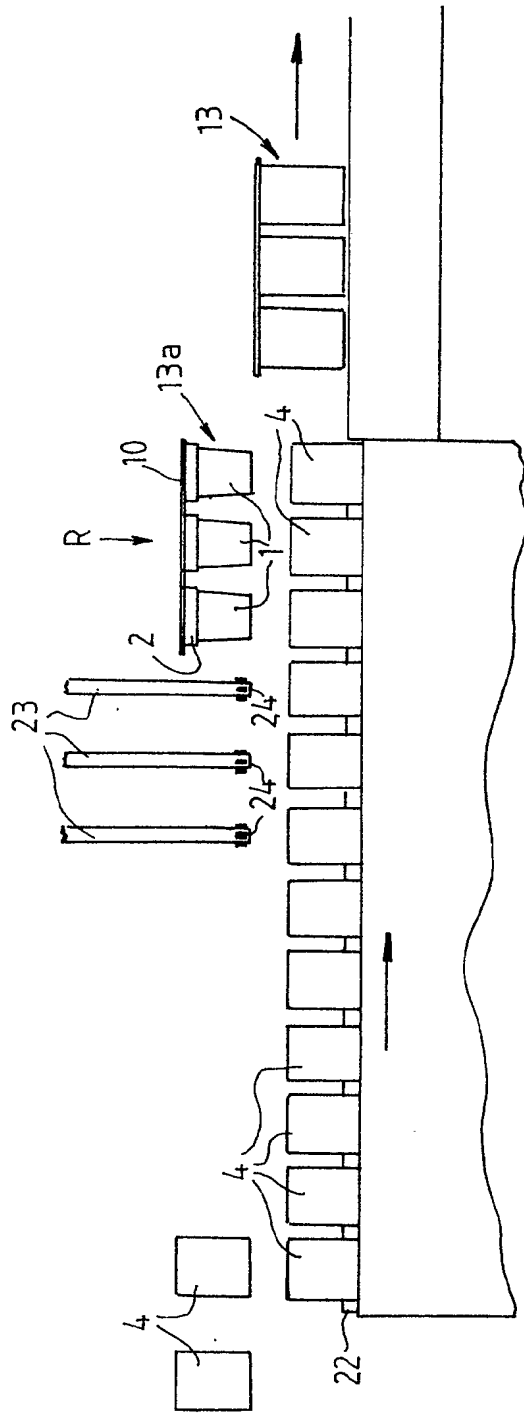


FIG. 4

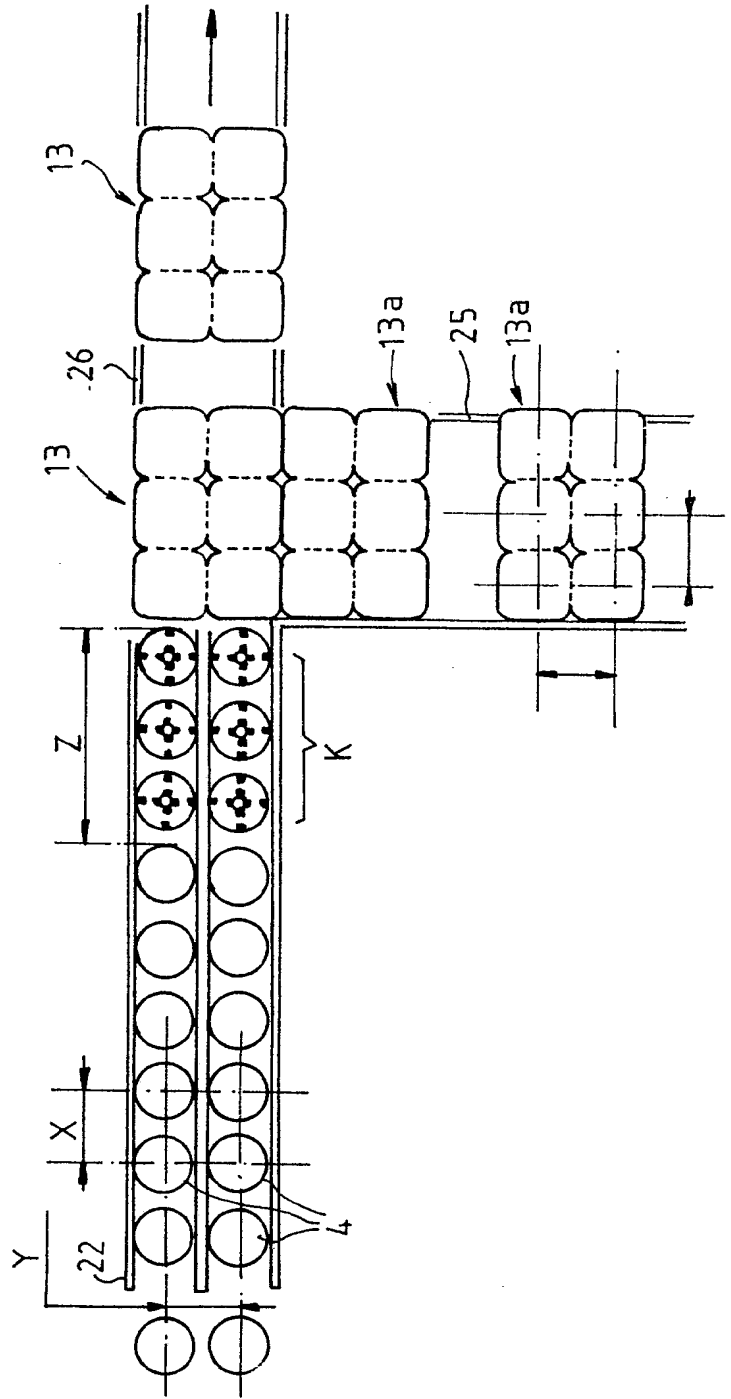


FIG. 5

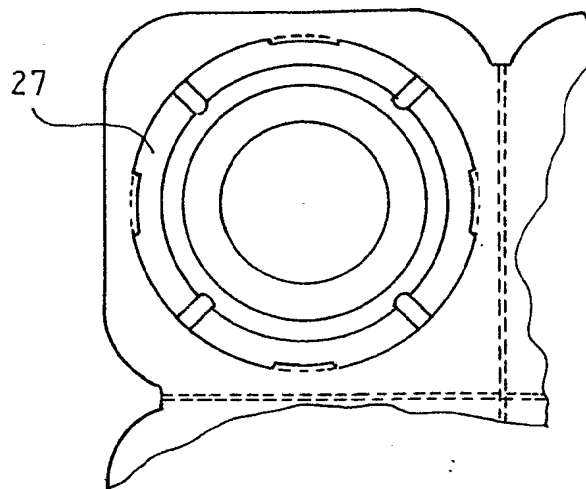


FIG. 6

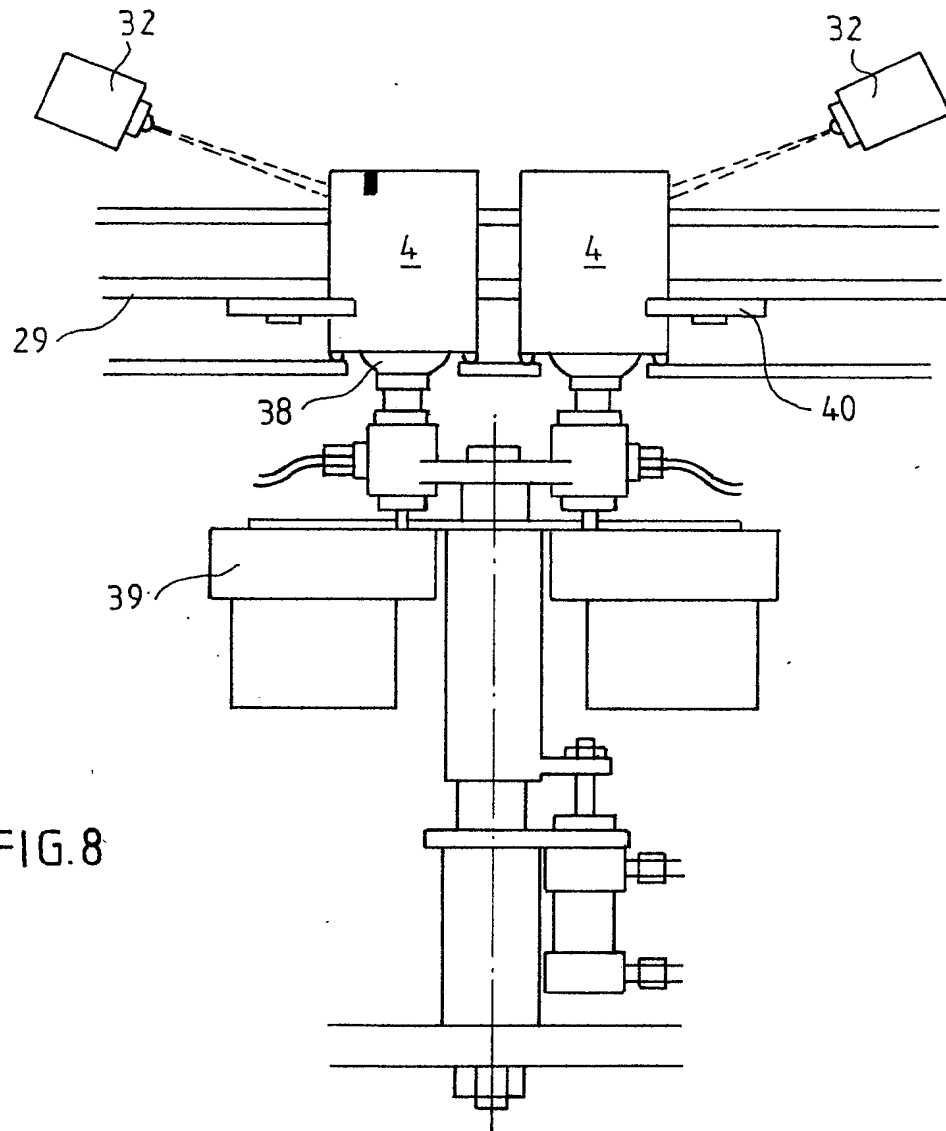
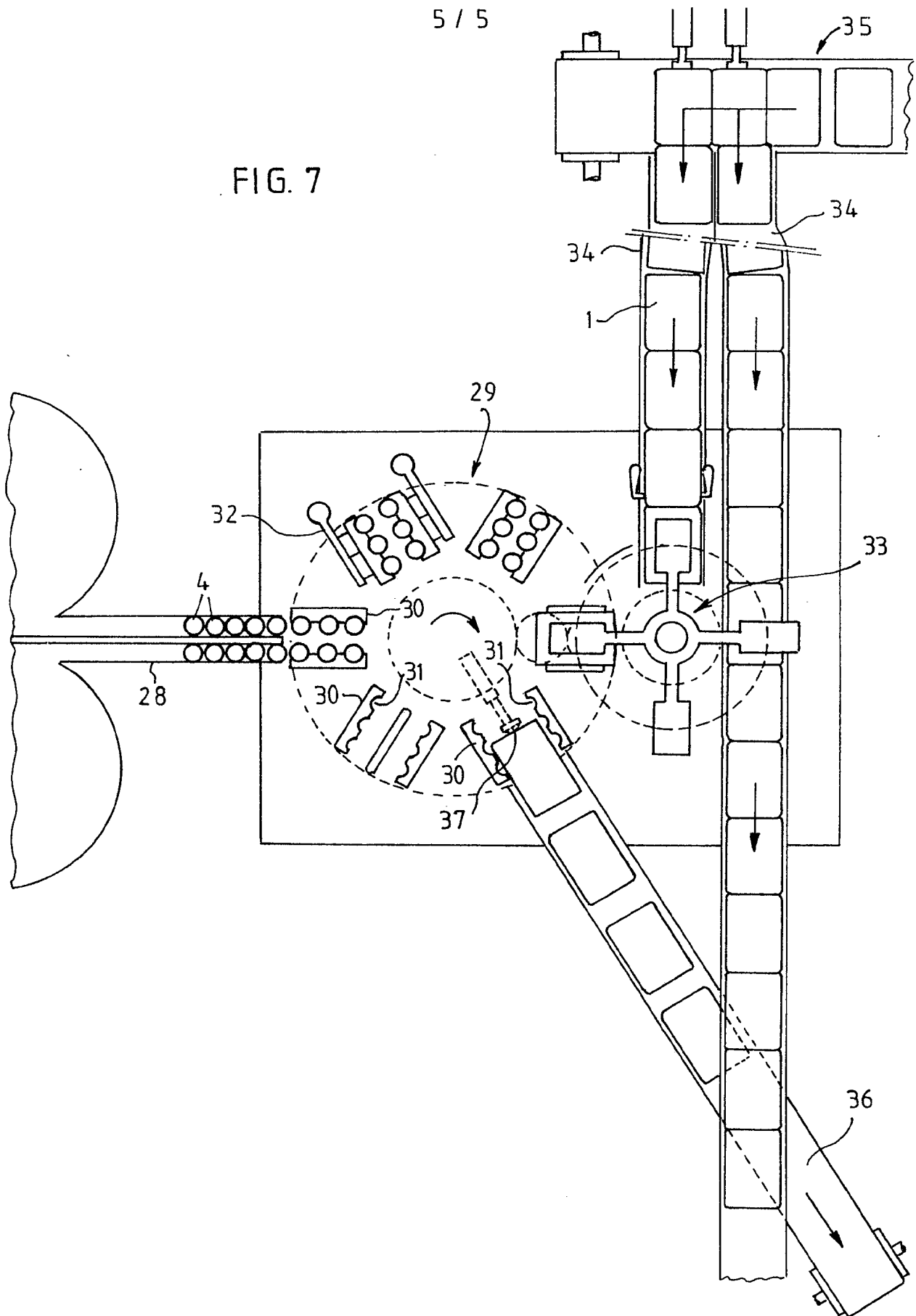


FIG. 8

FIG. 7



SPECIFICATION

Improvements in or relating to isothermal receptacles

The present invention relates to a novel isothermal receptacle, that is to say ensuring an intense thermal insulation of the food products which it is adapted to contain, to a method of assembling such a receptacle and of packaging the food products in this, and to an assembling and packaging installation using this method.

Isothermal containers are known in the prior art. In particular, the French Patent 2 409 926 describes a container generally of cardboard comprising a double wall defining an insulating interstice containing air or a suitable material, such a double wall likewise being able to be provided on the bottom and/or the cover of the container. The bottom is crimped in the outer wall which is provided with a metallic reinforcement at its base. The upper opening, likewise provided with a metallic reinforcement, comprises a bead which holds the inner wall and serves as a seating for a cover. Nevertheless, such a container has the disadvantage of not ensuring sufficient tightness and of having a relatively high cost price.

The British Patent 1 397 877 describes insulating containers adapted to receive metal tins containing drinks, while enabling said drinks to be drunk directly from the tins. According to this Patent, the tin of drink is held in the insulating container by friction, without its walls being rigidly connected to those of the insulating container, so that the insulating container can be re-used by replacing the tin of drink which has been consumed by a new full tin of drink. Moreover, the insulating container according to this Patent, which is made of heat-insulating plastics material, comprises either a solid wall or two concentric lateral walls which define between them an insulating space in which a vacuum is created or which is filled with air and which is closed at its upper end by a partition which connects the upper ends of the concentric lateral walls; at their base, these walls are rigidly connected to two horizontal walls which are spaced apart and which constitute the bottom of the container; the cover, likewise consisting of two walls spaced apart to create an enclosed space, is articulated on the container by means of a hinge and is provided with an operating lever for the opening; at its upper portion, the container comprises a recess into which a projection carried by the cover first without play, in the closed position, the opening of the cover giving access to the recess and facilitating the direct drinking of the drink contained in the metal tin housed in the insulating container. As can be seen, the insulating container is of relatively complicated construction and is therefore expensive and necessitates repeated, tedious and sometimes difficult manipulations on the part of the consumer for the introduction of a tin to be insulated, its removal and its replacement.

The object of the present invention is to

provide isothermal containers which meet the practical requirements better than the insulating containers known in the prior art, particularly in that they ensure an excellent insulation of the products which are contained therein, at ambient temperature, for a sufficient time between the place of sale and the place of consumption, for their texture not to be impaired, particularly in the case of frozen products; in that their cost price is low; in that they lend themselves to assembly and packaging on assembly and packaging lines at a high rate, being automated; in that they can be packed in boxes and stacked so that their storage when empty and full takes up relatively little space; and in that they are constructed, at least so far as their external walls are concerned and possibly their external closing means, of a material permitting the printing of various inscriptions, such as a designation of the products, composition, method of use, information, publicity, decorative drawings etc.

The present invention relates to an isothermal receptacle, particularly for food products, comprising an inner receptacle of impervious material, an outer receptacle, an inner cover which can be fitted, after the inner receptacle has been filled, in the opening of the latter, a second cover of impervious, light and strong material, air spaces of substantially equal thickness being created between the lateral walls, the bottoms and the covers of the two receptacles, which isothermal receptacle is characterised in that the inner receptacle comprises a flange to the lower face of which there is fixed by adhesion or the like, the upper edge of the outer receptacle, and to the upper face of which there is fixed by soldering, adhesion or the like, the second cover.

According to an advantageous form of embodiment of the isothermal receptacle according to the invention, the inner receptacle is made of plastics material which can be used for food and the outer receptacle is made of a material such as cardboard, composite cardboard, or plastics material which can be printed, the inner cover is made of cardboard, composite cardboard or of plastics material, and the outer cover is made of cardboard, paper, composite laminated material, plastics material which can be welded or stuck, or of aluminium.

According to a particularly advantageous form of embodiment of the isothermal receptacle according to the invention, the inner receptacle consists of a plurality of pots rigidly connected to an external flange, produced simultaneously by any suitable means such as hot shaping or injection moulding, adapted to form regroupings or "packs" and able to be detached from one another along lines of reduced strength likewise formed during production.

According to an advantageous arrangement of this form of embodiment, the outer receptacle consists of a plurality of substantially tubular structures closed by a bottom at their lower end, which surround each of the inner pots with which they are assembled by adhesion or the like of their

upper edge to the lower face of the flange of the corresponding inner pot.

Within the meaning of the present invention, a tubular structure is understood to mean a

5 structure having any appropriate section, and particularly a circular, polygonal, ellipsoidal section, a section which is variable in the direction of height such as that of a frustoconical structure or of a truncated pyramid etc.

10 According to another advantageous arrangement of this form of embodiment, the outer receptacle consists of a trough or the like which includes the whole of the regrouping of inner pots and the upper edge of which is
15 assembled, by adhesion or the like, with the lower faces of the external segments of flanges of the rigidly connected pots.

According to the invention, the inner and outer receptacles may have any suitable shape, and particularly a cylindrical or substantially frustoconical shape, permitting the stacking of a plurality of said receptacles prior to the packing operation and their stacking after assembly
20 packing.

25 Likewise according to the invention, the inner receptacles are provided with lugs adapted to facilitate their removal from a stack and moreover to ensure the pre-centering of the associated outer receptacles on the inner receptacles.

30 According to the invention, the substantially tubular structure which constitutes the outer receptacle is made by spiralling or winding a strip of cardboard or of composite cardboard.

Likewise according to the invention, the outer
35 receptacle is provided with an inner lining for protection against the humidity liable to form in the insulating space.

According to an advantageous form of embodiment of the isothermal receptacle
40 according to the invention, the bottom of the outer receptacle is fixed to the base of the lateral walls of the latter by crimping or the like, or by adhesion followed by rolling of the base of the lateral walls.

45 According to another advantageous form of embodiment of the isothermal receptacle according to the invention, the inner cover comprises an excision of appropriate shape permitting the easy removal of said cover by the
50 consumer, at the moment of consumption of the contents of the inner receptacle.

According to yet another advantageous form of embodiment of the isothermal receptacle according to the invention, the inner receptacles
55 comprise, close to their upper edge, an undercut adapted to facilitate their automatic removal from a stack and also permitting the spring engagement of the inner cover in each of said inner receptacles.

60 The present invention likewise relates to a method of assembling the isothermal receptacle according to the invention and of packing, particularly food products, in such a receptacle, characterised in that it comprises the following
65 successive operations: —(i) bringing an inner

receptacle to a filling station; —(ii) introduction of the product to be packaged into the inner receptacle; —(iii) placing an inner cover in position in the inner receptacle; —(iv) placing an
70 outer cover or the like in position on the inner receptacle; —(v) assembling an outer receptacle on the inner receptacle.

According to an advantageous means of carrying out the method of assembly and
75 packaging according to the invention, the operation (v) of assembling the outer receptacle on the inner receptacle is preceded by a refrigeration or freezing treatment (vi) of the product packed in the inner receptacle.

80 According to another advantageous means of carrying out the method of assembly and packing according to the invention, the operation (v) of assembling the outer receptacle on the inner receptacle is effected before the operation (ii) of
85 packing the product, particularly a food product, in the inner receptacle.

According to another advantageous means of carrying out the method of assembly and packing according to the invention, the operation (v) of
90 assembling the outer receptacle on the inner receptacle is preceded by an operation (viii) of orientation of the outer receptacle to place each outer receptacle in a constant position with a view to placing in position the inscriptions carried
95 by said outer receptacles at one and the same position.

According to another advantageous means of carrying out the method of assembly and packing according to the invention, the operation (v) of
100 assembling the outer receptacle on the inner receptacle is preceded by an operation (vii) of manufacturing the outer receptacle by spiralling, winding or the like of a strip of cardboard or of composite cardboard to obtain a substantially
105 tubular structure and assembly of the bottom by crimping or the like or by adhesion followed by rolling of the lower edge of said tubular structure.

According to an advantageous means of carrying out the method of assembly and
110 packing according to the invention, this comprises the following succession of operations: —(a) bringing an inner receptacle to a filling station; —(b) orientation of an outer receptacle into the desired correct position; —(c) assembly of an
115 outer receptacle on the inner receptacle; —(d) introduction of the product to be packaged into the inner receptacle; —(e) placing an inner cover in position in the inner receptacle; —(f) placing an outer cover in position on the inner receptacle; —
120 (g) possibly refrigeration treatment of the packaged product.

According to an advantageous arrangement of this means of carrying out, the operation (b) of
125 orientation of an outer receptacle in the desired correct position is preceded by an operation of manufacture of the outer receptacle of the type of the above-mentioned operation (vii).

According to an advantageous means of carrying out the method of assembly and packing
130

according to the invention, the upper outer cover is fixed to the inner receptacle by adhesion or welding.

- 5 According to another advantageous means of carrying out the method of assembly and packing according to the invention, the outer receptacle is assembled on the inner receptacle by adhesion or the like, particularly by adhesion under heavy pressure, with or without heating, of the upper
10 edge of the outer receptacle on the lower face of the flange with which the inner receptacle is provided.

- The present invention also relates to a high-speed automatic assembly installation for the isothermal receptacles according to the
15 invention, which is characterised in that it comprises, in combination: —a conveyor belt for supplying a plurality of outer receptacles; —a zone for spacing said outer receptacles, said
20 spacing being selected to correspond to the distance between the axes of the successive inner receptacles with which said outer receptacles are adapted to be associated; —possibly a zone for orientating said outer receptacles in a desired
25 correct position; —a zone for depositing adhesive on the upper edges of the outer receptacles; —a conveyor belt for bringing the inner receptacles towards a zone of assembly with the outer receptacles; —a zone for assembling the outer
30 receptacles on the inner receptacles; —a conveyor belt for the removal of the isothermal receptacles resulting from the assembly of the outer receptacles on the inner receptacles.

- According to an advantageous form of
35 embodiment of the zone for spacing the outer receptacles, this comprises a pocketed conveyor belt into each pocket of which an outer receptacle is released on the advance of all the outer receptacles originating from the above-mentioned
40 drive belt.

- According to another advantageous form of embodiment of the zone for spacing the outer receptacles, this comprises a conveyor belt provided with integrated stops disposed at
45 suitable intervals.

- According to yet another advantageous form of embodiment of the zone for spacing the outer receptacles, this comprises an endless screw, rotating step by step and entraining the outer
50 receptacles at its pace.

- According to an advantageous arrangement of the invention, the spacing between the adjacent outer receptacles, in the spacing zone, is calculated to correspond, on the one hand to the
55 distance between the axes of two adjacent inner receptacles in the feed direction and on the other hand to the distance between the axes of two adjacent inner containers in the direction transverse to the feed direction.

- According to another advantageous arrangement of the invention, the zone for the orientation of the outer receptacles comprises suction devices for gripping the base of the outer receptacles, which suction devices are given a
60 rotational movement at a suitable speed adapted

to bring said receptacles into a desired correct position, in cooperation with photo-electric cells.

- According to the invention, the zone for depositing adhesive comprises at least one gun for depositing adhesive hot or cold on the upper
70 edges of the outer receptacles which travel past in said zone, in position on the conveyor belt or the spacing screw, which gun comprises at least one adhesive distributing nozzle.

- According to an advantageous arrangement of said zone for depositing adhesive, the or each gun for depositing adhesive comprises a nozzle adapted to deposit a line of adhesive on the upper edge of each of the outer containers which
80 appears in said zone.

- According to an advantageous mode of this arrangement, the nozzle deposits a line of adhesive on the upper edge of each outer container which appears and which is given a
85 rotational movement during the deposition of adhesive.

- According to another advantageous arrangement of said zone for depositing adhesive, the or each gun for depositing adhesive is designed to deposit dots of adhesive on the upper edges of the outer receptacles and comprises a number of nozzles corresponding to the number of dots of adhesive to be deposited.
90

- According to an advantageous arrangement of the invention, the gun or guns is or are lowered to the level of the upper edge of the receptacles in order to deposit the lines or the dots of adhesive there, by means of appropriate mechanical or pneumatic means, such as a pneumatic jack in particular.
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- Likewise according to the invention, the zone for the deposition of adhesive is omitted if the outer receptacles are of the type comprising an adhesive resulting from manufacture, at their upper portion.
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- According to an advantageous form of embodiment of the zone for assembling the outer receptacles on the inner receptacles, this comprises at least one pincer which grasps the inner receptacles arriving in said zone on a feed conveyor belt distinct from the feed conveyor belt or screw for the outer receptacles and situated at a higher level than the latter, to lower them and place them in position in the outer receptacles carried by said conveyor belt or screw.
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115

- According to another advantageous form of embodiment of the zone for assembling the outer receptacles on the inner receptacles, this comprises an elevator device which raises the outer receptacles to the arrival level of the inner receptacles which arrive in said assembly zone on a guide fitted in abutment below the flanges of the inner receptacles and situated at a higher level than the arrival level of the outer receptacles, said elevator device ensuring the positioning and the placing in position of the outer receptacles on the inner receptacles.
120
125

- According to another advantageous form of embodiment of the automatic installation for the assembly of the isothermal receptacles, this
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comprises, in combination: —a device for the automatic removal of a plurality of outer receptacles from a stack; —a feed conveyor belt for said plurality of outer receptacles; —a rotating
 5 circular plate comprising a plurality of working zones each comprising a plurality of pockets to receive the outer receptacles; —a conveyor belt for bringing a plurality of inner receptacles, previously packed and covered, to said rotating
 10 plate; —a conveyor belt for removing the assembled isothermal receptacles.

According to an advantageous arrangement of this form of embodiment, the rotating plate is associated with a plurality of working stations spaced at appropriate intervals between the
 15 conveyor belt for supplying the outer receptacles and the conveyor belt for removing the assembled isothermal receptacles, which working stations comprise successively: —a first working station
 20 comprising means for positioning the outer receptacles on leaving the feed conveyor belt, in the pockets of the working zone of the rotating plate which is facing the feed conveyor belt; —a second working station comprising means for
 25 orientating the receptacles in a desired correct position; —a third working station comprising means for applying adhesive to the upper edge of the outer receptacles; —a fourth working station which comprises means for placing the inner
 30 receptacles in position in the outer receptacles; —a fifth working station which comprises means for removing the isothermal receptacles assembled at the fourth station.

According to advantageous modes of this form of embodiment: —the station for orienting the
 35 outer receptacles comprises suction devices given a rotational movement at an appropriate speed by a micromotor which cooperate with photoelectric cells to control the orientation; —the station for
 40 applying adhesive comprises, in combination, suction devices for grasping the outer receptacles, given a rotational movement at an appropriate speed by a micro-motor, and a nozzle for the atomization of adhesive which is immobile and
 45 mounted in such a manner as to deposit a continuous line of adhesive on the upper edge of the outer receptacles thus driven in rotation, which travel past in front of said nozzle; —the station for placing the inner receptacles in
 50 position in the outer receptacles comprises a rotating plate—or turret—which receives the inner receptacles, advantageously filled and covered, brought by a conveyor belt, to deposit them in the inner receptacles carrying said line of
 55 adhesive which arrive at said station for placing in position.

According to the invention, the high-speed automatic assembly installation for the isothermal receptacles according to the invention is
 60 associated with an installation for the automatic packing of products, particularly food products, in said receptacles.

According to an advantageous arrangement of this form of embodiment, the packing installation
 65 is associated with the assembly installation by

means of the conveyor belt or the slide for supplying the inner receptacles.

According to another advantageous arrangement of this form of embodiment, the
 70 packaging installation is associated with the assembly installation by means of the conveyor belt for the removal of the isothermal receptacles.

According to yet another advantageous arrangement of this form of embodiment, the
 75 packaging installation associated with the assembly installation by means of the conveyor belt or the sliding guide for supplying inner receptacles comprises, in combination: —a device, known *per se*, for removing from a stack
 80 inner receptacles which are introduced in stacks into the packaging installation; —at least one filling device comprising a container for the product to be packaged, associated with at least one filling nozzle; —a first device for gripping
 85 covers from a storage enclosure and for placing these in position in the opening of the corresponding inner receptacles, known *per se*; —a second device for gripping covers from a second storage enclosure and placing these in
 90 position on the upper outer edge of the corresponding inner receptacles, known *per se*; —a device for fixing, particularly by welding or by adhesion, said second covers placed in position on the upper outer edge of the inner receptacles;
 95 —and a conveyor adapted to bring the inner receptacles successively to the filling device, to the devices for gripping and placing in position the first and second covers and to the device for fixing said second covers to the upper edge of the
 100 inner receptacles, the assembly installation associated with said packaging device by means of the feed conveyor belt or sliding guide, making isothermal receptacles by assembling outer receptacles on inner receptacles filled with
 105 products, particularly food products, and closed.

According to an advantageous method of constructing such a packaging installation, this
 110 comprises, following on the device for fixing outer covers on the upper edges of the inner receptacles, a tunnel for refrigerating or freezing the products contained in said inner receptacles, at the exit from which the latter are taken over by the conveyor belt or the sliding guide for supplying them to the installation for assembly
 115 with the outer receptacles.

According to another advantageous arrangement of the invention, the packaging installation associated with the assembly
 120 installation by means of the conveyor belt for the removal of the isothermal receptacles is fed with isothermal receptacles obtained by assembling outer receptacles on empty inner receptacles and comprises, in combination: —at least one filling device comprising a container for the product to
 125 be packaged, associated with at least one filling nozzle; —a first device for gripping covers from an enclosure for storing covers and for placing these in position in the opening of the corresponding isothermal receptacles; —a second device for
 130 gripping covers from a second enclosure for

storing covers and for placing these in position on the upper outer edge of the isothermal receptacles; —a device for fixing, particularly by welding or adhesion, said second covers on the upper outer edge of the isothermal receptacles; —possibly a refrigeration tunnel for the products contained in the isothermal receptacles; —and a conveyor adapted to bring the isothermal receptacles successively to the aforesaid devices constituting the packaging installation.

According to the invention, the automatic assembly installation is associated, upstream, with a machine for the automatic manufacture of the outer receptacles comprising, in combination; —a device for unwinding a strip of suitable material such as cardboard, composite cardboard, cardboard lined with an inner lining of the quality known as "food"; —a device for spiralling or winding on a mandrel to form a substantially tubular structure; —a device for cutting the strip, operating intermittently and programmed depending on the dimensions of the tubular structure; —a device, known *per se*, for placing in position and fixing a bottom substantially at the base of said tubular structure.

Likewise according to the invention, the automatic assembly installation is associated with a machine for the manufacture of the inner receptacles, such as a hot-forming or injection-moulding machine, which delivers inner receptacles either to the conveyor belt or to the sliding guide for supplying inner receptacles to the assembly device, or to the packaging installation associated with the assembly installation, as the case may be.

Apart from the preceding arrangements, the invention comprises yet other arrangements which will be apparent from the following description.

The invention relates more particularly to the novel isothermal receptacles, particularly for food products, according to the invention, the installations for manufacturing and assembling these isothermal receptacles and the methods and installations for packaging products, particularly food products, in said receptacles, according to the preceding arrangements, as well as the integrated production lines including the methods, installations and receptacles according to the present invention.

The invention will be better understood with the aid of the rest of the description which follows and which refers to the accompanying drawings in which:

The invention will be better understood with the aid of the rest of the description which follows and which refers to the accompanying drawings in which:

Figure 1 is a view in elevation with partial vertical section, of an isothermal receptacle according to the invention.

Figure 2 is a view from above, with part broken away, of the isothermal receptacle of Figure 1.

Figure 3 is a diagrammatic illustration of an assembly cycle for an isothermal receptacle

according to the invention and packaging cycle using such a receptacle.

Figure 4 is a diagrammatic side view of an assembly installation for isothermal receptacles.

Figure 5 is a plan view of the assembly installation of Figure 4.

Figure 6 is a view from above of another form of embodiment of the isothermal receptacle according to the invention.

Figure 7 is a diagrammatic illustration, in plan view, of an assembly installation for isothermal receptacles, equipped with a rotating table, and

Figure 8 is a diagrammatic illustration, in side view, of the second working station of the installation of Figure 7.

It should be clearly understood, however, that these drawings and the corresponding descriptive passages, are given solely by way of illustration of the subject of the invention which they in no way limit.

The isothermal receptacle according to the present invention is particularly suitable for the packaging of ice cream, ices, sorbet, fresh drinks, dairy products such as milk, yogurt, fresh cheese, dessert creams and other food products of which the texture, the state or the freshness are liable to be spoilt by maintenance or transport at the ambient temperature.

The isothermal receptacle according to the invention comprises an inner receptacle such as an inner pot 1 of plastics material for use with food and impervious, the plastics material selected being, for example, polypropylene, polyethylene, polystyrene, polyvinyl chloride, etc. and being suitable to permit the manufacture of the pot 1 by hot forming, injection moulding or any other appropriate shaping technique. The inner pot 1 may be constructed in the form of an individual pot (as shown in Figure 3) or as an element of a plurality of pots rigidly connected to one another, regrouped to form a "pack" of a plurality of pots, numbering 2, 4, 6 (as illustrated in Figures 1, 2, 4 and 5), 8 or more, depending on the requirements for the sale of such regroupings.

The inner pot 1 is provided with a flange 2 which extends substantially horizontally from the upper edges of said pot. The pot 1 may advantageously be made in such a manner as to have a substantially frustoconical shape (frustum of a cone or frustum of a pyramid), such a shape being particularly favourable to permit the stacking of a plurality of these inner pots 1, one inside the other, for their introduction into the installation for the manufacture of the isothermal pots according to the invention and for the packaging of the products in these pots. In such a case, it is likewise an advantage to provide the inner pot 1 with lugs 3 disposed in pairs of lugs diametrically opposite, namely 2, 3 or 4 pairs of lugs, which facilitate the automatic removed from a stack of the inner pots 1 which are stacked and their introduction into the installation for the assembly of the isothermal pots according to the invention and for packaging products in said pots. It is likewise advantageous to provide the inner

pot 1 with an undercut 27 close to its upper edge, the advantages of such an undercut being to improve further the ease of automatic removal of the inner pots from a stack and to permit the placing in position of the inner cover 8 by spring engagement in the lower pot 1 (cf. Figure 6).

During the assembly operation which will be described further on in connection with the description of the method of assembly and packaging and with the description of the installation for assembly and packaging according to the invention, an inner pot 1 is enclosed in an outer pot 4 of suitable material, particularly of cardboard, preferably of composite cardboard such as internal newsboard with external white coated paper which can be printed or such as cardboard coated with polyethylene or aluminium, or cardboard, which may or may not be composite, waxed internally or bearing an interior coat of varnish for protection against humidity; the outer pot 4 may also be made of plastics material, by hot forming, injection moulding, blow forming or any other appropriate technique. If the outer pot 4 is made of plastics material, the walls and the bottom are obtained in a single operation by one of the known moulding techniques, the principal ones of which have been enumerated above; if the outer pot 4 is made of cardboard, it is composed of a substantially tubular portion obtained by any suitable means and particularly by spiralling or by winding, and of a bottom 5 which is then preferably likewise of cardboard and which is fixed substantially to the base of the tubular portion by adhesion, at 6, then rolling of the base of the tubular portion to form a bead 7, or by crimping or by any other similar suitable technique.

After packaging of a product in the inner pot 1, the latter is provided with an inner cover 8 of cardboard or of plastics material, which is accommodated, slightly gripped, in the flange 2 and which comprises an excision 9 adapted to facilitate the removal of the cover 8 by the consumer at the moment of consumption, by introducing the tip of the finger or the end of a spoon into the excision 9 to grasp the cover 8 and withdraw it from the opening of the inner pot 1. The inner pot 1 is also closed by a second cover, namely an outer cover 10 of suitable material such as aluminium, cardboard, paper, composite laminated material, plastics etc. which is fixed to the upper face of the flange 2 by adhesion or welding or which is snapped over the pot to act as a lid. If the inner pot 1 constitutes one of the elements of a regrouping or "pack", the outer cover 10 may be fixed, by adhesion or welding, either over each of the individual pots which constitute the regrouping, or over all the pots constituting the regrouping; in such a case, just as the regrouping of pots 1 comprises lines of reduced strength 11 between the flanges 2 of two adjacent pots 1 to permit the separation of the pots of the regrouping at the moment of consumption, so also the outer cover 10 is provided with lines of reduced strength 12

superimposed on the lines of reduced strength 11 of the regrouping (designated in general by the reference 13 in the drawings); these lines of reduced strength are obtained by means well known to one skilled in the art, which it is therefore not necessary to describe in the present context.

The outer pot 4 is assembled with the inner pot 1, for example by providing its upper edge 14 with dots of adhesive, as described further on, which ensure the fixing of the upper edge 14 of the outer pot 4 to the lower face of the flange 2 of the inner pot 1. Instead of dots of adhesive, it is possible to use an outer pot 4 provided, in the vicinity of its upper edge, with a layer of adhesive which is caused to adhere, under strong pressure, with or without heating according to the selection of the adhesive, to the lower face of the flange 2 of the inner pot 1. It should be added that the lugs 3 with which the inner pot 1 is provided facilitate the centering of the outer pot 4 when it is placed in position over the inner pot 1. The isothermal pot 15 is constructed in such a manner that there is an air space between the side walls of the inner and outer pots, between the inner 8 and outer 10 covers and between the bottom 1' of the inner pot 1 and the bottom 5 of the outer pot 4; this air space is of the order of 5 mm for example, after assembly, thus creating a jacket of air of substantially equal thickness over the whole of the circumference of the inner pot 1.

The isothermal pot 15 enables a product such as ice cream, dairy product, fresh drink or the like, to be packaged in a perfectly impervious manner, while ensuring the insulation of the product contained in the inner pot 1 keeping it at the temperature at which it was packaged for a sufficient time to permit its transport from the place of sale to the domicile of the consumer, either with a view to its immediate consumption or with a view to storing it in a freezer or a refrigerator, without its temperature, and consequently its state, particularly in the case of a frozen product, being impaired during this space of time; moreover, the selection of the material of the outer pot 4 and of the outer cover enable drawings and the like to be printed there and so to give the isothermal pot according to the invention an attractive appearance. Furthermore, the placing in position of an insulating outer pot 4 which does not participate in the operations of refrigeration or freezing of the packaged product, as described above, leads to the fact that the outer pot is not cold which represents an element of comfort for the consumer at the moment of purchase.

When a plurality of inner pots 1 are regrouped to form a "pack" 13, the isothermal pot 15 is obtained either as illustrated in the drawings (cf. Figures 1, 2, 3 and 5) or by placing in position and fixing an outer pot 4 on each of the inner pots 1, or, as a variant, by placing in position a single trough including all the inner pots 1 constituting the regrouping 13a and fixing this trough, by

adhesion or the like, to the outer segments of the flanges 2 of the inner pots 1.

The isothermal pots according to the invention are assembled by carrying out an assembly and packaging process which will now be described with reference to Figure 3 which constitutes a form of embodiment given by way of non-limiting example and some modifications of which will be indicated.

10 A stack of pots 1, coming from manufacture, is automatically separated in the course of stage 1, by means of known techniques such as suction for example, to permit the distribution of the pots individually in the installation for assembly and packaging which will be described below; the individual pots 1 are brought to the filling station II where they are filled with the product to be packaged such as ice cream, ice, sorbet or a dairy product (yogurt or dessert cream for example) or fresh drink or any other refrigerated or frozen product or product to be frozen, which it is desired to maintain at a given optimum temperature, after packaging; from the station II, the individual filled pots 1 are brought to a station III where the inner covers 8 coming from a storage enclosure 16 are taken over by a device 17 for gripping and placing in position, for example of the type with a suction device known in the technology in question, which places each of the inner covers 8 in the opening of the pot 1 brought to the station III. At the following station, namely the station IV, the outer covers 10, coming from a storage enclosure 18, are taken over by a device for gripping and placing in position 19, for example of the type with a suction device, to be placed in position on the flange 2 of the pot 1, following which, they are stuck or welded to the latter at the station V. The pots 1, filled and closed by the inner 8 and outer covers 10 in a step-by-step rotary or linear machine of the type with pockets distributed in a plurality of parallel rows—or tracks—of the type of the machines produced and marketed by the Companies "Alfa-Laval", "Hoyer", "Cazas", "Gasti", in particular, are removed from this machine at the station VI from where they are sent, for example, on a conveyor 20, into a freezing tunnel VII where a temperature of the order of -45° prevails.

Outer pots 4 are manufactured at the station VIII, by spiralling, starting from a strip 21 of lined cardboard, for example, to obtain a substantially tubular structure 4a to which a bottom 5 is fixed by adhesion and rolling of the lower edges of the tubular structure 4a to form a bead 7. The outer pots 4 thus formed are brought to the station IX at which the pots 1 likewise arrive on leaving the freezing tunnel (station VII) and where the pots 4 are assembled by adhesion to the pots 1 to form the isothermal pot 15 according to the invention.

60 In a modification, the outer pots 4 may be assembled with the inner pots 1 before the stages of filling and closure of the latter, for example if the products to be packaged have to be introduced into the receptacles according to the invention at their preserving temperature—

particularly with regard to dairy products or fresh drinks—and there is therefore no freezing stage, or if the outer pots 4 are provided with an adhesive of the "hot melt" type (which adheres by application of a strong pressure and an elevated temperature) and therefore have to be assembled with the outer pots 1 by adhesion at temperatures liable to impair the freezing or refrigeration temperatures of the packaged products.

75 Although the process of assembly and packaging according to the invention, described by way of example above, refers to the assembly and packaging of individual pots, it will easily be understood that it applies equally to the assembly and packaging of regroupings of inner pots—or packs—and particularly to the assembly of the latter both with individual outer pots and with troughs including all the inner pots constituting a pack, particularly by providing the filling device with a plurality of combined nozzles for simultaneous filling and by providing the stations for placing the inner and outer covers in position with a plurality of suction devices for gripping and placing in position, with simultaneous coordinated operation, while a multiplication of simultaneous operations, well known to one skilled in the art, is provided at the other stations.

The novel installation, according to the invention, for assembling the outer pots 4 with the inner pots 1 will now be described with reference to Figures 4 to 6 which represent two non-limiting examples of embodiment thereof.

The installation illustrated in Figures 4 and 5 is an example of an installation for assembling outer pots 4 on the rigidly connected inner pots 1 of a regrouping 13a of pots, as carried out at the assembly station IX of Figure 3.

The outer pots 4, originating from a manufacturing stage such as the station VIII of Figure 3, if they are made of coated cardboard, for example, or from a hot forming or injection-moulding or blow-moulding machine if they are made of plastics material, are supplied on a conveyor belt 22 with pockets in two tracks, for example of the type mentioned above; the pots 4 are released in sequences for a spacing adapted to permit their correct distribution in correspondence with the distances between the axes X and Y of the pack 13a of six pots 1 with which they have to be assembled; in order to do this, they are placed on two tracks with, between each pot 4, a spacing X and Y corresponding to the distances X and Y between the axes of the pack 13a of six pots 1. This spacing can be effected in various ways and in particular:

120 —either by positive driving on a conveyor belt 22 with two tracks, pocketed or with integrated stops, the accumulated pots 4 being released into each pocket on the advance of the conveyor belt 22;

125 —or by an endless screw rotating step-by-step and entraining the pots 4 at its pace.

With the pots 4 being thus guided with a spacing X and Y and the whole of the machine advancing in accordance with a sequence Z, six

guns 23 for the distribution of adhesive (hot or cold adhesive) are lowered, in the zone K, to deposit dots of adhesive by means of the nozzles 24 simultaneously on the upper edges of six pots 4 disposed in groups of 3 on each of the two tracks of the conveyor belt 22; it is also possible to deposit the adhesive in the form of lines by rotation of the pots 4 in relation to a fixed nozzle; the upward and downward travel of the guns for the distribution of adhesive 23 is effected by means of any suitable mechanical or pneumatic means, and particularly by means of pneumatic jacks (not illustrated).

Packs 13a of six pots 1 (or of 2, 4 or 8 pots or more) coming from the freezing tunnel (station VII of Figure 3), filled and closed as described above with reference to Figure 3, are taken over by a collecting conveyor belt 25 by which they are brought into the actual assembly zone R in which the pots 4, previously gummed in the zone K, are assembled on the pots 1 constituting a pack 13a, in the following manner: a pack 13a is grasped, by the outer segments of the flanges 2 of the pots 1, by suitably centred pincers (not illustrated) which lower the pack 13a into the pots 4 placed below on the conveyor belt 22, which become fixed below the flanges 2 of the pots 1 of said pack, by the dots of adhesive on their upper edges. The regroupings of isothermal pots 13 thus assembled are removed on a conveyor belt 26 towards a wrapping zone (not illustrated). In a modification, instead of lowering the packs 13 into the pots 4, an elevator table or other means may be provided which raise a group of six pots 4 to the pots 1 forming the pack 13a.

The installation which has just been described may have various modifications and in particular:

- the modification according to which the packs 13a intended to be assembled with the pots 4 are supplied on the collecting conveyor belt 25, on leaving a manufacturing machine, such as a hot-forming or injection-moulding machine, that is to say unfilled and in the open state, the conveyor belt 26 removing the assembled isothermal pots, not to a wrapping zone, but to successive packaging and internal and external covering zones and possibly to a refrigeration or freezing zone, then to a wrapping zone;
- the modification according to which the outer pots 4 having been provided with an adhesive in the course of production, the zone for the distribution of adhesive is omitted, a device for sticking by application of pressure and possibly heat being then provided in the assembly zone R between the unfilled packs in the open state, as in the previous modification, and the outer pots 4;
- the modification according to which the outer pots 4 are replaced by a single trough of suitable dimensions to include all the pots 1 of a pack;
- the modification according to which the collecting conveyor belt 25 is adapted to supply not packs but individual inner pots.

It goes without saying that the term "pots" includes receptacles of all dimensions, whether it is a question of receptacles intended to receive individual portions or receptacles adapted to receive an amount of packaged product intended for family consumption or for communities.

The installation illustrated in Figures 7 and 8 comprises a conveyor belt 28 for supplying a plurality of outer pots 4—possibly coming from a manufacturing stage such as the station VIII of Figure 3 and possibly likewise from a station for removal from a stack of known type—to a rotating circular table designated in general by the reference 29; the outer pots 4 may be individual pots or be regrouped into a plurality of pots or "packs". The rotating table 29 is given an intermittent rotary movement which stops the pots 4 to be processed at each working station for the required period, such an intermittent movement of rotation being obtained by means of an indexing motor of suitable type such as the "Ferguson" indexer for example.

The pots 4 are released from the conveyor belt 28 in sequences to be placed in position on the rotating table 29. This comprises a plurality of working zones 30, each of which comprises a plurality of pockets adapted to receive a corresponding number of outer pots 4. The working zones 30 are at least equal in number to the number of working stations provided in association with the rotating table and which will be discussed below.

The first working station is situated at the exit from the conveyor belt 28 and comprises means for positioning (not illustrated) a plurality of pots 4 released from the conveyor belt 28 in the pockets 31 of the working zone 30 of the rotating table 29 stopped opposite the exit from the conveyor belt 28.

As soon as said positioning has been effected, the table 29 is driven in rotation to arrive at the second working station, which is the station for orientating the pots 4 in the desired correct position. It is, in fact, desirable that the inscriptions and/or drawings carried by the outer pots should be placed precisely at the position required, hence the necessity of orientating the pots correctly, for this purpose; this is why an orientation station is provided in which suction devices 38 for gripping are brought up to grasp the bottom of the pots; each of these suction devices 38 is given a rotational movement of appropriate speed, by a micro-motor 39. The pots are also held by pincers 40 which are slightly released during the rotation of the suction devices.

It goes without saying that although no orientation device has been described in connection with the form of embodiment illustrated in Figures 4 and 5, the installation illustrated in Figures 4 and 5 may advantageously comprise such a device as well as the turntable illustrated in Figure 7.

The correct orientation is controlled by photo-electric cells 32.

When the pots 4 have been orientated correctly, the rotating table 29 is driven in rotation to arrive at the third working station which likewise comprises members for gripping the bottom of the pots 4, such as, preferably, suction devices (not illustrated) given a movement of rotation of one revolution (and while maintaining the orientation acquired at the second station) in the course of which the upper edge of the pots 4 passes in front of a fixed nozzle for atomizing adhesive (not illustrated), which deposits a line of adhesive there; when this operation is terminated, the rotating table 29 is driven in rotation to bring the pots contained in the pockets of the working zone 30 in question to the fourth working station where the individual inner pots 1 or those regrouped in packs, are disposed in the gummed outer pots 4, by a turret 33, the upper edge 14 of the pots 4 then adhering to the lower face of the flanges 2 of the pots 1. The inner pots 1 reach the turret 33, which is likewise driven in rotation by the indexing motor which drives the rotating table 29, by a conveyor belt 34, coming from a packaging installation, designated as a whole by the reference 35, where they have been filled and closed respectively by an inner cover 8 and by an outer cover 10.

As can be seen in Figure 7, in order to comply with the rhythm of the installation according to the invention, two conveyor belts 34 feed the turret 33 simultaneously.

Once the assembly of the pots 1 in the pots 4 has been effected, the isothermal receptacle according to the invention obtained are driven, by the sequential rotation of the table 29, to the following station where they are discharged onto the removal conveyor belt 36, by a discharge device such as the piston 37.

As is clear from the above, the invention is in no way limited to those methods of carrying out, of construction and application which have just been described more explicitly; on the contrary it includes all the modifications which may come to the mind of one skilled in the art, without departing from the framework or the scope of the present invention.

Claims

1. An isothermal receptacle, particularly for food products, comprising an inner receptacle of impervious material, an outer receptacle, an inner cover which can be fitted, after the inner receptacle has been filled, to the opening of the inner receptacle, a second cover of impervious, light and strong material, and air spaces of substantially equal thickness between the lateral walls, the bottoms and the covers of respective receptacles, the isothermal receptacle being characterised in that the inner receptacle comprises a flange having a lower face to which an upper edge of the outer receptacle is fixed by adhesion or the like and an upper face to which the second cover is fixed by welding, adhesion or the like.

2. An isothermal receptacle as claimed in claim

1, characterised in that the inner receptacle is made of plastics material suitable for use with food and the outer receptacle is made of a material such as cardboard, composite cardboard or plastics material which can be printed, the inner cover is made of cardboard, composite coated cardboard or of plastics material and the outer cover is made of cardboard, paper, composite laminated material, plastics material which can be welded or stuck, or of aluminium.

3. An isothermal receptacle as claimed in either of the Claims 1 and 2, characterised in that the inner receptacle consists of a plurality of pots rigidly connected (1) to an outer flange (2), produced simultaneously by any suitable means such as hot forming or injection moulding and adapted to constitute regroupings or "packs" (13a) and able to be detached from one another along lines of reduced strength (11) likewise formed during manufacture.

4. An isothermal receptacle as claimed in Claim 3, characterised in that the outer receptacle consists of a plurality of substantially tubular structures (4a) closed by a bottom (5) at their lower end, which surround each of the inner pots (1) with which they are assembled by adhesion or the like of their upper edge (14) to the lower face of the flange (2) of the corresponding inner pot (1).

5. An isothermal receptacle as claimed in Claim 3, characterised in that the outer receptacle consists of a trough or the like which contains the whole of the regrouping (13a) of inner pots and the upper edge of which is assembled by adhesion or the like with the lower faces of the segments of outer flanges (2) of the rigidly connected pots.

6. An isothermal receptacle as claimed in any one of the Claims 1 to 5, characterised in that the inner and outer receptacles have any suitable shape and particularly a cylindrical shape or a substantially frustoconical shape, permitting the stacking of a plurality of said receptacles prior to the packaging operation and their stacking after assembly and packing.

7. An isothermal receptacle as claimed in any one of the Claims 1 to 6, characterised in that the inner receptacles are provided with lugs (3) adapted to facilitate their removal from a stack and also to ensure the precentring of the associated outer receptacles on the inner receptacles.

8. An isothermal receptacle as claimed in any one of the Claims 1 to 7, characterised in that the substantially tubular structure (4a) which constitutes the outer receptacle is made by spiralling or winding of a strip of cardboard or of composite cardboard.

9. An isothermal receptacle as claimed in any one of the Claims 1 to 8, characterised in that the outer receptacle (40) is provided with an inner lining for protection against the humidity liable to form in the insulating space.

10. An isothermal receptacle as claimed in Claim 8, characterised in that the bottom (5) of

the outer receptacle (4) is fixed to the base of the lateral walls of the latter by crimping or the like, or by adhesion followed by rolling of the base of the lateral walls.

5 11. An isothermal receptacle as claimed in any one of the Claims 1 to 10, characterised in that the inner cover (8) comprises an incision (9) of appropriate shape permitting the easy removal of said cover by the consumer at the moment of
10 consumption of the contents of the inner receptacle (1).

12. An isothermal receptacle as claimed in any one of the Claims 1 to 11, characterised in that the inner receptacles (1) comprise, close to their
15 upper edge, an undercut (27) adapted to facilitate their automatic removal from a stack and furthermore to permit the snap engagement of the inner cover (8) in each of said inner receptacles (1).

20 13. A method of assembling the isothermal receptacle as claimed in any one of the Claims 1 to 12, and of packing, particularly food products, in such a receptacle, characterised in that it comprises the following successive operations: —
25 (i) supply of an inner receptacle to a filling station; —(ii) introduction of the product to be packed into the inner receptacle; —(iii) placing in position of an inner cover in the inner receptacle; —(iv) placing in position of an outer cover or the like on
30 the inner receptacle; —(v) assembly of an outer receptacle on the inner receptacle.

14. A method as claimed in Claim 13, characterised in that the operation (v) of assembling the outer receptacle on the inner
35 receptacle is preceded by a refrigerating or freezing treatment (vi) of the packed product in the inner receptacle.

15. A method as claimed in any one of the Claims 13 or 14, characterised in that the
40 operation (v) of assembling the outer receptacle on the inner receptacle is effected before the operation (ii) of packing the product, particularly a food product, in the inner receptacle.

16. A method as claimed in any one of the Claims 13 to 15, characterised in that the
45 operation (v) of assembling the outer receptacle on the inner receptacle is preceded by an operation (viii) of orientating the outer receptacle to place each outer receptacle in a constant
50 position with a view to placing the inscriptions carried by said outer receptacles in position at one and the same position.

17. A method as claimed in any one of the Claims 13 to 16, characterised in that the
55 operation (v) of assembling the outer receptacle on the inner receptacle is preceded by an operation (vii) of manufacturing the outer receptacle by spiralling, winding or the like a strip of cardboard or of composite cardboard to obtain
60 a substantially tubular structure and assembly of the bottom by crimping or the like or by adhesion followed by rolling of the lower edge of said tubular structure.

18. A method of assembling the isothermal
65 receptacle as claimed in any one of the Claims 1

to 12 and of packing products, particularly food products, in such a receptacle, characterised in that it comprises the following succession of operations: (a) supplying an inner receptacle to a
70 filling station; —(b) orientation of an outer receptacle in a desired correct position; —(c) assembly of an outer receptacle on the inner receptacle; —(d) introduction of the product to be packaged into the inner receptacle; —(e) placing
75 in position of an inner cover in the inner receptacle; —(f) placing in position of an outer cover on the inner receptacle; —(g) possibly refrigeration treatment of the packaged product.

19. A method as claimed in Claim 18, characterised in that the operation (b) or
80 orientating an outer receptacle in a desired correct position is preceded by an operation of manufacturing the outer receptacle of the type of the operation (vii) according to Claim 17.

20. A method as claimed in any one of the Claims 13 to 19, characterised in that the outer
85 cover is fixed to the inner receptacle by adhesion or welding.

21. A method as claimed in any one of the Claims 13 to 20, characterised in that the outer
90 receptacle is assembled on the inner receptacle by adhesion or the like, particularly by adhesion under strong pressure, with or without heating, of the upper edge of the outer receptacle on the
95 lower face of the flange with which the inner receptacle is provided.

22. A high-speed automatic installation for assembling isothermal receptacles as claimed in any one of the Claims 1 to 12, characterised in
100 that it comprises, in combination: —a conveyor belt (22) for entraining (22) or supplying (28) a plurality of outer receptacles (4); —a zone for spacing said outer receptacles, said spacing being selected to correspond with the distance between
105 the axes of the successive inner receptacles (1) with which said outer receptacles are adapted to be associated; —possibly a zone (32) for orientating said outer receptacles (4) in a desired correct position; —a zone (K) for depositing
110 adhesive on the upper edges of the outer receptacles; —a conveyor belt (25 or 34) for supplying the inner receptacles (1, 13a) to a zone for assembly with the outer receptacles; —a zone (R) for assembling the outer receptacles (4) on the
115 inner receptacles (1, 13a); —a conveyor belt (26 or 36) for removing the isothermal receptacles (15, 13) resulting from the assembly of the outer receptacles (4) on the inner receptacles (1, 13a).

23. An installation as claimed in Claim 22, characterised in that the zone for spacing the
120 outer receptacles comprises a pocketed conveyor belt into each pocket of which an outer receptacle is released on the advance of the whole of the outer receptacles coming from the above-mentioned entrainment conveyor belt.

24. An installation as claimed in Claim 22, characterised in that the zone for spacing the
125 outer receptacles comprises a conveyor belt provided with integrated stops disposed at suitable intervals.

25. An installation as claimed in Claim 22, characterised in that the zone for spacing the outer receptacles comprises an endless screw rotating step-by-step and entraining the outer receptacles at its pace.

26. An installation as claimed in any one of the Claims 22 to 25, characterised in that the spacing between the adjacent outer receptacles, in the spacing zone, is calculated to correspond on the one hand to the distance between the axes of two adjacent inner receptacles (1) in the direction of entrainment and, on the other hand, to the distance between the axes of two adjacent inner receptacles (1) in the direction transverse to the direction of entrainment.

27. An installation as claimed in any one of the Claims 22 to 26, characterised in that the zone for orientating the outer receptacles comprises suction devices (38) for gripping the base of the outer receptacles, which suction devices are given a movement of rotation of appropriate speed adapted to bring said receptacles into a desired correct position, in cooperation with photo-electric cells (32).

28. An installation as claimed in any one of the Claims 22 to 26, characterised in that the zone (K) for depositing adhesive comprises at least one gun (23) for depositing hot or cold adhesive on the upper edges of the outer receptacles which travel past in said zone, in position on the conveyor belt or the spacing screw, which gun comprises at least one nozzle for distributing adhesive.

29. An installation as claimed in Claim 28, characterised in that the or each gun for depositing adhesive comprises a nozzle adapted to deposit a line of adhesive on the upper edge of each of the outer receptacles which appears in said zone.

30. An installation as claimed in Claim 28, characterised in that the nozzle deposits a line of adhesive on the upper edge of each outer receptacle which appears and which is given a movement of rotation during the deposition of adhesive.

31. An installation as claimed in Claim 28, characterised in that the or each gun for depositing adhesive is designed to deposit dots of adhesive on the upper edges of the outer receptacles and comprises a number of nozzles (24) corresponding to the number of dots of adhesive to be deposited.

32. An installation as claimed in any one of the Claims 28 to 31, characterised in that said gun or guns (23) is or are lowered to the level of the upper edge of the outer receptacles in order to deposit the dots or the lines of adhesive there, by means of suitable mechanical or pneumatic means such as a pneumatic jack in particular.

33. An installation as claimed in any one of the Claims 22 to 27, characterised in that the zone for depositing adhesive is omitted if the outer receptacles are of the type comprising an adhesive provided during manufacture, at their upper portion.

34. An installation as claimed in any one of the Claims 22 to 33, characterised in that the zone (R) for assembling the outer receptacles on the inner receptacles comprises at least one pair of pincers which grasps the inner receptacles (1, 13a) arriving in said zone (R) on a feed conveyor belt distinct from the conveyor belt (22) or entrainment screw for the outer receptacles (4) and situated at a higher level than the latter, to lower them and place them in position in the outer receptacles carried by said conveyor belt or screw.

35. An installation as claimed in any one of the Claims 22 to 24, characterised in that the zone for assembling the outer receptacles on the inner receptacles comprises an elevator device which raises the outer receptacles (4) to the level at which the inner receptacles arrive, which receptacles arrive in said assembly zone (R) on a sliding guide fitted in abutment below the flanges (2) of the inner receptacles (1) and situated at a higher level than the level at which the outer receptacles (4) arrive, said elevator device ensuring the positioning and placing of the outer receptacles (4) on the inner receptacles (1).

36. An installation as claimed in any one of the Claims 22 to 31, characterised in that it comprises, in combination: —a device for the automatic removal from a stack of a plurality of outer receptacles; —a conveyor belt for supplying said plurality of outer receptacles; —a rotating circular table comprising a plurality of working zones each comprising a plurality of pockets to receive the outer receptacles; —a conveyor belt for supplying a plurality of inner receptacles previously packed and covered, to said rotating table; —a conveyor belt for removing the assembled isothermal receptacles.

37. An installation as claimed in Claim 36, characterised in that the rotating table is associated with a plurality of working stations spaced, at its periphery, at appropriate intervals between the conveyor belt for supplying the outer receptacles and the conveyor belt for removing the assembled isothermal receptacles, which working stations comprise successively: —a first working station comprising means for positioning the outer receptacles, on leaving the supply conveyor belt, in the pockets of the working zone of the rotating table which is facing the supply conveyor belt; —a second working station comprising means for orientating the receptacles in a desired correct position; —a third working station comprising means for depositing adhesive on the upper edge of the outer receptacles; —a fourth working station which comprises means for placing the inner receptacles in position in the outer receptacles; —a fifth working station which comprises means for removing the isothermal receptacles assembled at the fourth station.

38. An installation as claimed in Claim 37, characterised in that the station for orientating the outer receptacles comprises suction devices (38) given a movement of rotation at an appropriate speed by a micro-motor (39), which

suction devices cooperate with photoelectric cells (32) for controlling the orientation.

39. An installation as claimed in Claim 37, characterised in that the station for applying
5 adhesive comprises, in combination, suction devices for gripping the outer receptacles, which suction devices are given a movement of rotation at an appropriate speed by a micro-motor, and a stationary nozzle for atomizing adhesive, which is
10 mounted in such a manner as to deposit a continuous line of adhesive on the upper edge of the outer receptacles thus driven in rotation, which travel past in front of said nozzle.

40. An installation as claimed in Claim 37, characterised in that the station for placing the inner receptacles in position in the outer receptacles comprises a rotating table—or turret—(33) which receives the inner receptacles preferably filled and covered, brought by a
20 conveyor belt (34) to deposit them in the inner receptacles carrying said line of adhesive which arrive at said station for placing in position.

41. An installation as claimed in any one of the Claims 22 to 40, characterised in that it is
25 associated with an installation (35) for the automatic packing of products, particularly food products, in said receptacles.

42. An installation as claimed in Claim 41, characterised in that the packing installation (35) is associated with the assembly installation by means of the conveyor belt (25 or 34) or sliding guide for supplying the inner receptacles (1, 13a).

43. An installation as claimed in Claim 41, characterised in that the packing installation is associated with the assembly installation by means of the conveyor belt (26) for the removal of the isothermal receptacles (15, 13).

44. An installation as claimed in Claim 42, characterised in that it comprises, in
40 combination: —a device, known *per se*, for removing from a stack the inner receptacles which are introduced in stacks into the packing installation; —at least one filling device comprising a container for the product to be
45 packed associated with at least one filling nozzle; —a first device (17) for gripping covers from a storage enclosure (16) and placing these in position in the opening of the corresponding inner receptacles (1) known *per se*; —a second device
50 (19) for gripping covers from a second storage enclosure (18) and placing these in position on the upper outer edge of the corresponding inner receptacles (1), known *per se*; a device for fixing, particularly by welding or adhesion, said second covers (10) placed in position on the upper outer edge of the inner receptacles (1); —and a conveyor adapted to bring the inner receptacles successively to the filling device, to the devices (17) and (19) for gripping and placing in position
60 the first and second covers (8 and 10) on the upper edge of the inner receptacles (1), the assembly installation associated with said packing device by means of the conveyor belt (25 or 34) or of the supply sliding guide, producing
65 isothermal receptacles (15, 13) by assembling the

outer receptacles (4) on the inner receptacles (1, 13a) filled with products, particularly food products.

45. An installation as claimed in Claim 44, characterised in that it comprises, following the device for fixing the outer covers on the upper edges of the inner receptacles, a tunnel for refrigerating or freezing the products contained in said inner receptacles, on leaving which the latter are taken over by the conveyor belt (25 or 34) or the sliding guide for supplying them to the installation for assembly with the outer receptacles (4).

46. An installation as claimed in Claim 43, characterised in that it is fed with isothermal receptacles obtained by assembling outer receptacles on empty inner receptacles and comprises, in combination; —at least one filling device comprising a container for the product to be packed associated with at least one filling nozzle; —a first device (17) for gripping covers (8) from an enclosure for storing (16) covers and for placing these in position in the opening of the corresponding isothermal receptacles (15, 13a); —a second device (19) for gripping covers (10) from a second enclosure (18) for storing covers and for placing these in position on the upper edge of the isothermal receptacles (15, 13a); —a device for fixing, particularly by welding or adhesion, said second covers (10) on the upper outer edge of the isothermal receptacles; —possibly a tunnel for refrigerating the products contained in the isothermal receptacles; —and a conveyor adapted to bring the isothermal receptacles successively to the aforesaid devices constituting the packing installation.

47. An installation as claimed in any one of the Claims 22 to 46, characterised in that it is associated, upstream, with an automated
105 machine for manufacturing the outer receptacles, comprising, in combination: —a device for unwinding a strip of suitable material such as cardboard, composite cardboard, cardboard lined with an internal lining of a quality called "food"; —a device for spiralling or winding on a mandrel to form a tubular structure; —a device for cutting the strip with intermittent operation programmed depending on the dimensions of the tubular structure; —a device, known *per se*, for placing in position and fixing a bottom substantially to the base of said tubular structure.

48. An installation as claimed in Claim 47, characterised in that it is associated with a machine for manufacturing the inner
120 receptacles such as a hot-forming or injection-moulding machine, which delivers inner receptacles either to the conveyor belt (25 or 34) or to the sliding guide for supplying inner receptacles to the assembly installation, or to the packing installation associated with the assembly installation, as the case may be.

49. An isothermal receptacle constructed and arranged as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

50. A method of assembling an isothermal receptacle substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

5 51. An installation for assembling isothermal

receptacles constructed, arranged and adapted to operate substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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